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ABSTRACT

This fourth edition of a review and synthesis of agricultural education research concentrates on the period from 1978 to 1984. The review covers research published in papers and bulletins, compilations of abstracts, proceedings of regional and national agricultural education research meetings, material in the ERIC database, masters' theses, and doctoral dissertations. Criteria for selection include the extent to which findings are generalizable, saliency of the research, and importance of the research question to agricultural education trends and issues. The document covers these aspects of agricultural education: (1) vocational-technical agricultural programs, encompassing curriculum and instruction, student organizations, supervised occupational experience, summer programs, and student recruitment, retention, placement, and followup; (2) personnel preparation, including teacher education programs, methods, and organizations; (3) instructional materials and technology, focusing on microcomputer applications; (4) professionalism, discussing master teachers, morale and satisfaction, and teacher retention; (5) relationships with publics, including public perceptions and program promotion; (6) international agricultural education; and (7) extension education. A summary section highlights areas for future research and the need for a national research agenda. An extensive bibliography of the cited studies concludes the document. (SK)

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AGRICULTURAL EDUCATION: REVIEW AND SYNTHESIS OF THE RESEARCH, FOURTH EDITION

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1985

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CONTENTS

FOREWORD v

EXECUTIVE SUMMARY vii

INTRODUCTION 1

- Purpose of This Document 1
- Use of This Publication 2
- Reviewing Research 2

VOCATIONAL-TECHNICAL AGRICULTURE PROGRAMS 3

- Major Thrusts 3
- Curriculum 3
- Instruction 6
- Student Organizations 7
- Supervised Occupational Experience 8
- Summer Programs 8
- Student Recruitment and Retention 9
- Student Placement and Follow-up 10

PERSONNEL PREPARATION 11

- Teacher Education Programs 12
- Teacher Education Methods 12
- Teacher Education Student Organizations 13

INSTRUCTIONAL MATERIALS AND TECHNOLOGY 15

- Microcomputer Applications 15
- Instructional Materials 16

PROFESSIONALISM 17

- Master Teachers 17
- Teacher Morale and Satisfaction 17
- Teacher Retention 18

RELATIONSHIPS WITH PUBLICS 19

- Public Perceptions 19
- Promotion of Relationships 19

INTERNATIONAL AGRICULTURAL EDUCATION 21

Program Development 21
Technology Dissemination 21
Personnel Preparation 22

EXTENSION EDUCATION 23

SUMMARY 25

Contributions of Completed Research 25
Future Research Needs 25
Commitment to Research: Need for a National Agenda 26

REFERENCES 27

FOREWORD

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is one of 16 clearinghouses in a nationwide information system that is funded by the National Institute of Education. One of the functions of the Clearinghouse is to interpret the literature that is entered into the ERIC database. This paper should be of particular interest to agricultural education teachers, teacher educators, administrators, curriculum development specialists, researchers, and graduate students.

The profession is indebted to Jasper S. Lee of Mississippi State University for his research in the preparation of the manuscript. Dr. Lee is Professor and Head of Agricultural and Extension Education; Agricommunication Advisor; and Extension Training Officer, Mississippi Cooperative Extension Service. Formerly, he served as an associate professor in the agricultural education program at Virginia Polytechnic Institute and State University. Dr. Lee, who is active in a number of professional associations, serves as a consulting editor to Gregg Division, McGraw-Hill Book Company and the *Journal of Research and Development in Education*. He previously served as the editor of the *Journal of the American Association of Teacher Educators in Agriculture* and the *Agricultural Education Magazine*. Dr. Lee has published extensively in the area of agriculture education.

Recognition is also due to Jimmy G. Cheek, Professor, Department of Agricultural and Extension Education, University of Florida; David L. Williams, Professor and Head, Department of Agricultural Education, Iowa State University; and N. L. McCaslin, Division Associate Director, and Larae Watkins, Program Associate, the National Center for Research in Vocational Education; for their critical review of the manuscript prior to its final revision and publication. Susan Imel and William Hull coordinated the publication's development. They were assisted by Sandra Kerka. Jean Messick typed the manuscript, and Janet Ray served as word processor operator. Editing was performed by Michele Naylor of the National Center's editorial services.

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in Vocational Education

EXECUTIVE SUMMARY

Research in agricultural education has become more sophisticated in recent years. It has emerged as a prominent endeavor among agricultural educators. The use of research findings to improve and expand agricultural programs is evident. The relationship between program quality and research should continue to be strengthened and expanded in the next few years.

This publication, the fourth edition of a review and synthesis of agricultural education research, concentrates on the period from 1978 to 1984. The review covers research published in papers and bulletins, compilations of abstracts, proceedings of regional and National agricultural education research meetings, and ERIC entries. Every study available to the author was considered, although not all studies were included. The author attempted to emphasize exemplary research addressing serious concerns in agricultural education using the following critera:

- The extent to which the findings could be generalized to State, National, and international audiences
- Saliency of the research
- The importance of the research question to agricultural education trends and issues.

In preparing the paper, the author used a strategy for reviewing research developed by Light and Pillemer (1984). To implement the strategy, the following five questions were addressed:

- What specific question is the review trying to answer?
- Is the review exploratory, or rather is it built around specific, testable hypotheses?
- Which studies should be included?
- To what populations can the main findings be generalized?
- Are there important differences in the ways studies were done?

However, because of the general nature of the review and synthesis process, the application of these questions was limited. Also, space limitations did not allow for full descriptions of populations and other characteristics of the studies reviewed.

The publication covers these aspects of agricultural education: (1) vocational-technical agriculture programs (curriculum and instruction, student organizations, supervised occupational experience, summer programs, and student recruitment, retention, placement, and follow-up); (2) personnel preparation (teacher education programs, methods, and organizations); (3) instructional materials and technology (microcomputer applications); (4) professionalism (master teachers, morale and satisfaction, and teacher retention); (5) relationships with publics (public

perceptions and program promotion); (6) international agricultural education; and (7) extension education.

In recent years, agricultural educators have been involved in at least two major research efforts in vocational-technical education in agriculture. These focused on program standards for quality programs and competencies needed in agricultural occupations. Increasingly, the curriculum in agricultural education has been based on the practices and trends in the agriculture industry, and research in this area has made considerable use of industry resources. Research on instruction has used experimental and ex post facto methods, and much of the effort has been to determine the effects of using various instructional approaches in developing cognitive and psychomotor skills. Research on student organizations has dealt primarily with the Future Farmers of America (FFA). The early 1980s have been characterized by a renewal of commitment to supervised occupational experience and considerable effort has been given to studying various aspects of it. On the other hand, summer programs have had limited research. Research on student recruitment and retention has looked at two areas: providing for equity in vocational-technical education and education for special needs students. Even though placement of graduates is a major concern, research on placement and follow-up has been limited.

The quality of vocational-technical education in agriculture programs is closely related to the technical and professional competence of teachers. Research related to the area of personnel preparation has studied recruitment and retention of competent teachers. It has examined different methods of teacher recruitment, retention of teachers, and methods of teacher preparation including teacher education programs and methods.

A new area of instructional materials and technology research focuses on microcomputer applications. Research studies related to microcomputer technology have looked at competencies needed by vocational agriculture teachers as well as the extent of use of microcomputers in vocational agriculture programs. Research into instructional materials development and use has been somewhat limited. Most of the efforts reported in the paper focus on the development process followed in producing the materials.

Considerable research has been reported that addresses such aspects of professionalism as morale, retention, and reentry. No research was found relating to professional organizations in agricultural education, but some research addressed the area of master and beginning teachers.

Although maintaining and promoting effective relationships with publics served by vocational education is considered an important role of the teacher, there were very few reported studies in these areas. There appears to be a definite need to pursue research on relationships with the various publics.

Judging by the number of studies, interest in international agricultural education is expanding rapidly. Many of the recent studies address specific agricultural problems in the various countries. Some are evaluative studies; others are developmental. A high proportion focus more on extension methods and needs than on vocational-technical agricultural education approaches.

Because agricultural education has expanded into extension education, that area is included. The expansion has occurred in both instruction and research. The research addresses problems in the United States as well as other countries.

A summary section highlights areas for future research and the need for a National research agenda. Areas for future research include the following:

- **Evaluation and accountability**—Studies addressing quality indicators in programs and the achievement of students who have been enrolled are needed.

- **Program delivery**—Studies dealing with program components and delivery methods are needed.

- **Curriculum**—Studies analyzing various curriculum areas, such as core curricula, locally derived curricula, and general principles versus industry practices are needed.

- **Alternative delivery of instruction**—Studies investigating alternatives for delivering instruction, especially in nontraditional areas such as agribusiness, and using increased industry involvement are needed.

- **Technology**—Research assessing the adoption of new instructional technology in agricultural education is needed.

A National research agenda would improve the direction, quality, and efficiency of research in agricultural education. Such an effort would give credibility and justification to increased research efforts.

Information on these areas of agricultural education research may be found in the ERIC system under the following descriptors: *Agricultural Education; *Educational Research; Extension Education; Instructional Materials; International Education; Master Teachers; Microcomputers; Postsecondary Education; Public Relations; School Holding Power; Secondary Education; *State of the Art Reviews; Student Organizations; Student Recruitment; Supervised Farm Practice; *Teacher Education; Teacher Morale; Teacher Persistence; *Vocational Education; Vocational Followup. Asterisks denote descriptors having particular relevance.

INTRODUCTION

Research in agricultural education has become more sophisticated in recent years. It has emerged as a prominent endeavor among agricultural educators. The use of research findings to improve and expand agricultural education programs is evident. The relationship between program quality and research should continue to be strengthened and expanded in the next few years.

Much of the research reported in this document was carried out by graduate students enrolled in the agricultural teacher education programs of various universities. The faculty members supervising these research activities may also be engaged in research of their own, but such research is of lesser quantity, as is evident in this document. As more of these departments gain affiliation with the agricultural experiment stations, the volume of research will likely increase and become more programmatic in thrust.

Efforts to enhance the competence of agricultural educators in research methodology and exchange the findings of completed research have increased since the mid-1970s. The National Agricultural Education Research Meeting (NAERM) is held each year in early December. First held in 1974, this meeting provides for the presentation of papers reporting research, critiques of the papers, and an inservice session on research methods. In addition, regional agricultural education research meetings are held annually. The Research Committee of the Agricultural Education Division of the American Vocational Association has compiled and published a document entitled *Summaries of Research and Development Activities in Agricultural Education* each year since 1974. In preparing this review and synthesis, these summaries were used extensively from 1978 to 1984. (The value of some of the abstracts presented in these documents could have been increased if more information about the studies had been included. For example, some abstracts state that a significant relationship was found but they do not give the direction of the relationship. Also, a new reporting format was adopted with the 1982-1983 edition. The new format has less utility than that used in previous editions.) Further, *The Journal of the American Association of Teacher Educators in Agriculture* and *The Journal of Vocational Education Research* are refereed quarterly publications with considerable emphasis on research in agricultural education.

Purpose of This Document

The purpose of this document is to review and synthesize selected research in agricultural education completed during the period from 1978 to 1984. The review involved studying research published in papers and bulletins, compilations of abstracts, proceedings of regional and National agricultural education research meetings, and ERIC entries. Every study available to the author has been considered, though not all studies are included. The studies were placed in categories as listed in the table of contents of this publication. The author attempted to emphasize exemplary research addressing serious concerns in agricultural education. The criteria used included the extent to which the findings could be generalized to State, National, and international audiences; saliency of the research; and the importance of the problem researched as related to trends and issues in agricultural education.

The term agricultural education, as used in this document, refers primarily to vocational-technical education in agriculture. Studies outside these areas have been included in only a few cases. Among such studies are several in international agricultural education—an area receiving increased emphasis by university researchers in agricultural teacher education programs—and cooperative extension education.

Use of This Publication

A review and synthesis publication is useful in a variety of ways. Foremost, since it represents an effort to pull together research from many sources focusing on the same problems, the reader may gain cursory insight into completed research without an exhaustive review. In-depth information is available by referring to the various studies cited. A review and synthesis publication helps persons interested in research by fostering the investigation of researchable problems and facilitating design. It offers examples worthy of replication in various situations. It also serves as the benchmark of the current status of research in agricultural education.

Reviewing Research

Individuals interested in reviewing research reports may find some valuable suggestions in *Summing Up: The Science of Reviewing Research* by Richard J. Light and David B. Pillemer (1984). The authors stress development of a guiding strategy for reviewing research that addresses the following five questions: What specific question is the review trying to answer? Is the review exploratory, or rather is it built around specific, testable hypotheses? Which studies should be included? To what populations can the main findings be generalized? Are there important differences in the ways studies were done?

The questions posed by Light and Pillemer were observed in the preparation of this document to the extent possible. Their application is limited by the general nature of the review and synthesis process. Further, space limitations do not allow full descriptions of populations and other characteristics of the studies reviewed.

VOCATIONAL-TECHNICAL AGRICULTURE PROGRAMS

In recent years, increased attention has focused on the conduct of quality programs of vocational-technical education in agriculture. Evidence supportive of this trend is presented throughout this publication. The target population consists primarily of three groups: secondary, postsecondary, and adult/young adult students. The needs of these three groups are not served by separate and distinct educational programming but rather by carefully articulated curricula. Instruction is provided using classroom and laboratory methods, supervised experience/practice, and student organizations. These typically function on a year-round basis and involve delivery systems different from those of other school programs.

Major Thrusts

In recent years, agricultural educators have been involved in at least two major efforts in vocational-technical education in agriculture. These focused on program standards for quality programs and competencies needed in agricultural occupations.

The benchmark effort in the specification of standards for quality programs was carried out by Iowa State University with a project sponsored by the U.S. Office of Education (*Standards for Quality Vocational Programs in Agricultural/Agribusiness Education* 1977). This study specified standards common to all programs of vocational-technical education in agriculture and to various specialized areas of agriculture for both secondary and postsecondary levels. It also included standards for adult education, teacher education, and administration and supervision. Many states have adapted these standards to their particular needs. Research is needed to assess the impact of the standards and ensure their continual revision and modernization.

McClay (1978) directed a nationwide effort to identify and validate essential competencies needed for entry and advancement in major agriculture and agribusiness occupations. The study reported competencies for 196 occupations in the agricultural industry. The findings of this study have had substantive impact on programming and curricula in vocational-technical agricultural education in the United States. This impact is evidenced by citations of the study in curriculum development projects, inservice teacher education activities, and the professional literature in general.

Curriculum

The curriculum in vocational-technical education in agriculture has been increasingly based on the practices and trends in the agricultural industry. Research in this area has made considerable use of industry resources. Hogue, Carnes, and Briers (1981) found that there were more than 150 emerging agricultural occupations in Texas. Examples of these include agricultural computer operator, horticultural supply clerk, smoke jumper, and seafood butcher. Hogue and his associates developed comprehensive job descriptions for each occupation, describing primary work requirements. These work requirements were to be used by teachers in developing instructional programs

and advising students. Supervisors, instructional materials developers, and others can use the findings to provide more relevant education and effect a better match between students and courses. Baggett (1982) developed a "job opportunity-based curriculum planning model" for program development. The eight-stage model provides for the matching of input from graduates and the agricultural industry to achieve a relevant curriculum.

Another general approach in curriculum development involves the needs assessment process. Parmley (1982) studied the need for vocational agriculture in school districts in Kansas where none was provided. It appears that rural residents and agribusiness respondents would like to have vocational agriculture instruction. School administrators apparently exercise influence in keeping it out, citing reasons such as lack of student interest, lack of facilities, lack of finances, and lack of need for vocational agriculture. Harriman (1981) investigated the role of needs assessment in Illinois community colleges. He found that citizen advisory councils, followed by past students and input from faculty, employers, and associations and organizations, were most widely used in identifying educational need. Harrod's research (1984) in Maryland and Effendi's (1984) in West Virginia are examples of local-level needs assessment studies in farming and agribusiness.

Secondary Curriculum

Most of the research in the area of curriculum in vocational-technical education in agriculture has been directed at the secondary level. Many of these studies have focused on the competencies needed in various agricultural occupations. Once the competencies have been validated, the basis for the curriculum is known. These studies have focused on clusters of occupations such as in agricultural mechanics (Maday 1984), ornamental horticulture (Bahen 1979 and Jensen 1981), and feed, seed, and grain (Bigo 1979), and on specific occupational titles such as dairy farm managers (Stenzel 1979) and agricultural mechanics in retail dealerships (Kesler 1983). The Vocational-Technical Education Consortium of States (V-TECS) has served to standardize competency studies and provide direction in conversion to curricula. (This was achieved by training curriculum development personnel in the competency specification process.) A good example of such research is the work of Hamilton (1983) in developing a catalog for farm machinery set-up mechanic and delivery person.

Several efforts have been made in developing curriculum guides, often based on competency studies. Some of these have been for statewide use in establishing core curricula at the various levels of instruction. The State of Illinois has had a multiyear study in developing a core curriculum (Russell and Courson 1984). Other States where similar work has been underway include Louisiana (Burnett 1983), Michigan (Karelse and Olson 1983), Texas (Brown 1978), and Oklahoma (Hatcher, Frazier, and Miller 1978).

A weakness in close adherence to competency studies in curriculum development is the lack of "future orientation." Competency studies are time bound. Such studies reveal only what was observed during the study and not what is needed in the future. It is imperative that competency studies be repeated frequently and that the new studies be used to revise curriculum.

Postsecondary Curriculum

Vocational-technical education in agriculture at the postsecondary level has been investigated from several perspectives. Goodale (1983) investigated a cost-effectiveness model for evaluating postsecondary curricula. Approaches for reaching nontraditional students in agricultural education by community colleges have been investigated (Ellsworth 1983). It was found that noncredit night classes reached more nontraditional students than did other approaches.

Recruiting and retaining students and articulating curricula are two important and related areas that have been studied. Guides for use in recruiting and retaining students have been developed in Florida (Waltz et al. 1984). Practices in articulating secondary and postsecondary agricultural education in Missouri were studied by Heiman (1983). He found that postsecondary teachers perceived articulation to be more important than did secondary teachers. Arfstrom (1977) studied student knowledge upon entry into postsecondary programs in Minnesota as related to success in the programs and possible advanced placement. He found that students who had taken vocational agriculture in high school scored slightly higher on the Agribusiness Achievement Test than those who had not taken vocational agriculture. Further, students with farm backgrounds scored significantly higher than those not having a farm background.

Adult/Young Adult Curriculum

Much of the research in adult/young adult vocational-technical education in agriculture has dealt with the area of farm management. Very little research has focused on adults in agribusiness and related areas of the agricultural industry. Mannebach (1983) conducted a study in Connecticut using 585 agricultural firms and 280 Farm Bureau members in an attempt to determine the extent of need for adult-level agricultural education. He found that there were 11,700 full- and part-time farm and agricultural firm employees who could benefit from adult education.

How do school superintendents feel about agricultural education? When Krill (1983) attempted to answer this question, he found that most superintendents in Ohio favored it but did not want to invest local money in it. However, the superintendents wanted such programs carried out under their direction by the local vocational agriculture teacher. In an Iowa study, Moeller (1981) found that school administrators agreed on the importance of adult agricultural education. Further, he found that program enrollees should participate in the planning of class sessions.

Hudson (1982) investigated the most effective procedures being used by teachers of young farmers in Virginia. It appears that experienced teachers rate some procedures as having a higher rate of effectiveness than do less experienced teachers. Miller and Hedges (1982) found that program policies and procedures are related to effectiveness in adult education. Twenty-two recommendations were made. An Iowa study (Smith 1980) revealed that young farmers attended commercial company meetings and valued farm magazines as sources of information. Also, the young farmers studied seldom participated in university short courses, vocational agriculture adult programs, and extension meetings and clinics.

Torgerson (1984) investigated the expectations farmers have for farm management education. The North Dakota study included 323 farmers who had been enrolled in adult farm management classes. The area of highest expectation was assistance in keeping records. Areas of technical agriculture were rated lower. A study of small-scale farmers in Arizona (Connors 1981) indicated that the greatest educational need was in methods of record keeping.

The educational needs of agribusiness employees were investigated in a two-county area of Ohio (Anderson 1982). Employers and employees alike perceived a need for education. Both employers and employees preferred the employer be responsible for delivering the instruction. Employees in agricultural mechanics and agricultural supplies and services perceived significantly greater educational needs than did those employees in horticulture or agricultural products.

Instruction

Instruction has been carried out in a variety of settings, with major emphasis on the classroom and laboratory. Research on instruction has used experimental and ex post facto methods. Much of the effort has been to determine the effects of using various instructional approaches in developing cognitive and psychomotor skills. The most practical research in instruction is that which is carried out in realistic settings involving students and teachers. Further, the environment for the research needs to be carefully controlled and monitored to minimize extraneous influences and maximize treatment effects. Some of the studies reported here likely experienced problems in this regard.

Studies of instruction are most valuable when the reports are written so that replication is enhanced. One or two studies do not usually comprise sufficient evidence to change practices in agricultural education.

The use of task instruction sheets has been studied by several individuals. Secondary, postsecondary, and adult students who used task instruction sheets on sheep production scored significantly higher than those who were taught without such sheets (Diamond 1981). Another study using task instruction sheets to teach vocational agriculture students about poultry and egg production found differences in achievement on some of the skills (Ajala 1981).

Independent study and lecture-discussion were compared in teaching basic vocational agriculture classes (McCully 1981). Using both pretests and posttests with three different instructional units, the study found no significant differences in achievement.

A study comparing traditional lecture-demonstration with small group self-study instruction in agricultural mechanics was made by Perritt (1981). No significant difference was found between the two with respect to psychomotor skills or attitude; however, a delayed cognitive posttest indicated that students in the small self-study groups receiving mediated instruction scored significantly higher. A study by Crownover (1983) investigated three instructional approaches in teaching arc welding. He found no difference in cognitive and psychomotor achievement. Tibbs (1979) found that cognitive test scores of adult students who were taught on-farm grain storage using the lecture technique versus independent study were higher but not significantly so. A study comparing traditional with open-entry teaching methods revealed that cognitive and psychomotor learning was higher with the traditional methods (Legacy 1979).

The effectiveness of various instructional procedures with special needs populations has been investigated. A study by White (1980) of the characteristics of effective teaching of disadvantaged learners found that small classes (no more than 12-14 students) with heavy laboratory emphasis were preferred by students and teachers. A study by Dunn (1980) found that individualized instruction, demonstrations followed by practice, and project construction were most appropriate with special needs learners.

Vocational agriculture teachers have long used problem solving as a teaching procedure. A study using problem solving in teaching animal nutrition revealed that hands-on, in-class activities produced high student interest and that transfer of cognitive information was acceptable (Johnson 1980).

The use of instructional time has long been a concern. In a study of time-on-task behavior in horticulture laboratories, Henderson (1983) found that students were on task 71 percent of the time and off task 29 percent of the time. Male students had higher time-on-task scores than females. Directness of teacher supervision was associated with time-on-task student behavior.

Student Organizations

Research on student organizations has dealt primarily with the Future Farmers of America (FFA). No research was found on the National Postsecondary Agricultural Student Organization. The available research tended to focus on the assessment of programs and participation by students. It appears that some of the research has been carried out with the major intent of justifying programs and activities. In the long run, such research is detrimental to agricultural education. Probing research is needed to investigate new approaches and assess programs and activities.

Several FFA programs have been assessed. A rather thorough assessment of the Building Our American Communities program revealed that the major benefits were to the FFA members (Malpiedi 1984). An assessment of the Dairy Cattle Contest and Milk Quality/Dairy Foods Contest found a positive attitude toward the contests by the participants (Howard 1984). A study of the importance of FFA leadership activities in Oklahoma revealed that the parent-member banquet was most important and that the exhibition of livestock and leadership activities were of equal importance (Wells 1983). Henderson (1980) found that sex bias did not appear to exist in the evaluation of applications for FFA degrees. Herren (1982) identified factors associated with the success of participants in the National Livestock Judging Contest, and found a strong relationship between amount of time given to preparation and success.

Some schools with vocational agriculture do not have FFA. A study in New York (Perry 1983) revealed that teachers in urban and suburban areas have difficulty relating the FFA to their students. Further, the teachers in these settings were found to lack FFA experience. Damann (1980) studied how the National FFA organization could assist local schools with FFA. He found little difference in expectations among teachers from rural, urban, urban fringe, and central city schools.

Various approaches have been used in the training of FFA officers. An experimental study using a resource packet (Neason 1983) revealed that the packet did not significantly affect achievement. An ex post facto study of participants in the Washington Conference Program (Campbell 1983) revealed that individual development was greatest in social and human relations, personal communications, and citizenship. The study also revealed that individual leadership training was more important than training for working with local FFA Chapters. An experimental study in Iowa using an instructional packet (J. D. Townsend 1981) revealed that teachers who were provided the packet and given inservice training had students who scored higher on the FFA attitude scale than did teachers using other methods.

Financing FFA activities is often a major concern. A study in Oklahoma (Meeks 1980) revealed that selling various products and services and FFA dues were most widely used to finance FFA activities. Meeks also found no relationship between chapter size and chapter income and expense. A study of the relationship of the knowledge advisors have about the FFA and the activeness of the chapters they advised (Kim 1979) revealed a significant correlation between level of knowledge of the teacher and chapter activeness in a number of areas. A study of the factors influencing FFA membership (Anderson 1980) revealed that vocational agriculture students who were nonmembers did not live on farms and did not have career goals in agriculture. C. D. Townsend (1981) studied the relationship between participation in FFA activities and self-perceived personal development and concluded that a relationship did exist between the two. Carter (1982) investigated factors related to FFA participation and found that the reputation of the FFA chapter and participation by members in the operation of the chapter were important. Connor (1982) found that former FFA members who had been active in certain FFA activities were more positive about the FFA than were those who had been in certain other FFA activities.

Supervised Occupational Experience

The opportunity for students to apply their classroom and laboratory instruction in real-world situations has given more relevance to instruction and the development of needed agricultural career competencies. The term widely used to describe such instruction is supervised occupational experience (SOE). Other terms have been used, such as supervised farming, supervised practice, and projects. The early 1980s have been characterized by a renewal of commitment to SOE. Considerable effort has been given to studying various aspects of SOE. Leading in the development of SOE materials and research about SOE have been Iowa State University and the University of Arizona.

The benefits of SOE to students, employers, and others are frequently enumerated. Agribusiness employers perceived that planned employment in an agribusiness is a desirable way for students to learn (Fletcher 1983). In another study (Pilgram 1983), the contributions of SOE in agribusiness were investigated as perceived by students, and a ranking of occupational ability items was established. Williams (1979) reported on Iowa research into the benefits of SOE, with the following five benefits ranked highest: encouraged the keeping of records, promoted the acceptance of responsibility, developed pride in ownership, helped attain advanced FFA degree, and encouraged the production of animals and crops. A Michigan study (Shahrokh 1983) to determine the most effective type of SOE revealed that students perceived that placement on farms or in an agribusiness was significantly better in developing competencies than was instruction in school land laboratories or home farm production. Cole and Herren (1983) found philosophical disagreement among Oregon vocational agriculture teachers on SOE. They felt that these differences contribute to varying levels of commitment at the local level. A study by Harris (1983) reconfirmed the matter of commitment by finding that teachers in low-quality programs placed low emphasis on SOE.

The merits of an instructional packet on SOE were assessed in Iowa (Slocombe 1983). It was found that the packet resulted in teachers giving more time to teaching SOE and that students had higher SOE knowledge and attitudes. Mlozi (1982) investigated teacher perceptions of problems that prevented SOE supervision and found that excessive paperwork, excessive numbers of students, and students without farm backgrounds were the major deterrents to supervision. Briers (1979) reported on the use of an instructional packet in teaching about SOE. He specifically studied student SOE knowledge, student SOE attitude, and SOE program planning. He found that students performed significantly better in these areas when the packet was used.

A study in Ohio (Lindsey 1978) reported that many students who were said to have limited opportunity for SOE actually lived on farms and were not limited by land. The study also found that limited-opportunity students generally recognized the importance of SOE but were less active in setting goals and learning more difficult skills.

An Iowa study (Memon 1983) assessed the perceived value of supervised work experience in postsecondary schools. Students, employers, and faculty considered the experience highly important. Administrators held somewhat different perceptions, with significant differences concerning certain duties of teachers in coordinating experience.

Summer Programs

Summer programs have had limited research. A National study of summer programs (Camp and Kotrlik 1984) identified summer activities and compared time allocations for these activities.

The major summer activities were attending conferences, participating in technical update activities, attending the State FFA convention and FFA leadership camps, and assisting with fairs and shows. Teachers felt that they spent less time than they should on SOE, field days, student recruitment, meetings with the advisory committee, FFA chapter meetings, and FFA chapter recreation and socials. Apparently, emphasis on instruction was not studied.

Baker (1983) studied the importance of summer activities as rated by Pennsylvania teachers and found that SOE supervision, FFA involvement, and professional improvement were most important. Short (1984) studied the attitudes of Ohio teachers toward summer programs and, in general, found positive attitudes toward summer programs. A North Dakota study (Witt 1982) found disagreement between teachers and school administrators on the activities to be carried out in the summer. Cepica and Irwin (1979) studied summer programs in Texas and found that teachers and administrators alike viewed summer activities as very important. Studies in Iowa (Hilton 1979) and Florida (Holmes 1979) supported the agreement among teachers and administrators found in Texas except that more emphasis was apparently placed on SOE in the Iowa and Florida studies.

Student Recruitment and Retention

Providing for equity in vocational-technical education has been the theme of some of the research on student recruitment and retention. This includes gender equity and mainstreaming of special needs students. The Education for All Handicapped Children Act (Public Law 94-142) has certainly had a major impact on vocational-technical education in agriculture programs.

Gender Equity

Vocational-technical education in agriculture has made considerable progress in enrolling female students. Research in California (Leising and Emo 1984) found that FFA membership in that state was 39.2 percent female and that the females held 45.2 percent of the chapter offices. In West Virginia, the attitudes and practices of vocational agriculture teachers toward female students were studied (Higgins 1984). It was found that both males and females were enrolled and that most teachers make a sincere effort to recruit females. Also, females are discouraged from enrolling by parents, peers, counselors, teachers, and administrators. A similar study carried out in Kansas (Parmley, Welton, and Bender 1981) found that females were encouraged by teachers, administrators, students, and parents to enroll in vocational agriculture.

Special Needs Students

Limited research has investigated the participation of special needs students in vocational-technical education in agriculture. Dill (1983) studied the knowledge vocational agriculture teachers had of Public Law 94-142 and found that teachers were unsure of the provisions of the act. Further, the teachers indicated minimal involvement with the mandated teaching practices. A Montana study (Harrington 1983) investigated the extent to which teachers were implementing the least restrictive environment component of Public Law 94-142. Half of the vocational agriculture teachers studied had had no involvement in the individualized educational plan (IEP) process, whereas a third had some academic preparation in working with the handicapped. Mallilo (1979) investigated the competencies of vocational teachers and found a definite need to improve their skills in working with special needs students.

A Wisconsin study (Gondert 1984) investigated the problems in accommodating special needs students in vocational agriculture. The biggest problems, as perceived by the teachers, were individualizing instruction and providing supervised occupational experience. A study by Potter (1984) found that the development of SOE for mainstreamed students could be enhanced if vocational agriculture teachers were present in IEP meetings. An Arizona study (Zamudio 1982) investigated the use of skill laboratories in teaching learning-disabled students and found that those learning-disabled individuals who had taken vocational agriculture performed significantly better in germination activities than those who had not taken vocational agriculture.

A nationwide study of gifted students enrolled in vocational agriculture (Pandya 1981) found that the number of such students enrolled was increasing; however, they represented only a small percentage of total enrollment. Individualized and accelerated instruction were the major intervention activities used.

Postsecondary Students

Only one study was found that addressed the retention of postsecondary students. Warner (1981) studied the five 2-year postsecondary farm management programs in North Dakota. Students who dropped out did so between the first and second years. Their major reason for doing so was to go into business on their own; however, it was suspected that multiple factors influenced their decisions.

Student Placement and Follow-up

Since the purpose of vocational-technical education in agriculture is to develop occupational competencies, placement of graduates is a major concern. Research on placement and follow-up has been limited. A study in Missouri (Mick 1983) found that high school graduates who, as students, had strong SOE were more likely to be employed in agricultural occupations. It was also found that those with weaker SOEs tended to begin in nonagricultural jobs with some movement toward agricultural jobs after five years. A 5-year follow-up study in Arizona (Zurbrick 1982) found that vocational agriculture was preparing people for agricultural jobs and that the competencies developed were being used. A Louisiana study (Kotrlik 1979) found that graduates have higher incomes and a lower rate of unemployment than the general population.

A regional study carried out by the Research Committee of the Southern Region and directed by Iverson and Brown (1979) attempted to determine the role of vocational agriculture in the occupational success of program graduates. The study included 1,252 respondents from 10 southern States. Experiences gained in vocational agriculture received high ratings and 92 percent would enroll again if they had it to do over.

Graduates of specialized programs in agribusiness were followed up 8 years later in Wisconsin (Shabbour 1978). They tended to be in agricultural jobs and rated their occupational experience as most useful to them in their jobs.

PERSONNEL PREPARATION

The quality of vocational-technical education in agriculture programs is closely related to the technical and professional competence of the teachers. Using the Delphi technique to identify those areas in need of improvement in vocational agriculture, Lawrence and Mallilo (1980) found that the recruitment and retention of competent teachers was the area rated most in need of improvement.

The preparation needed to teach vocational agriculture is a much debated subject. Some teachers complete university-level teacher education programs while others are recruited from the agricultural industry with little regard for professional or technical preparation. A Montana study (Welch 1984) of the attitudes of administrators and vocational teachers toward a 5-year teacher preparation program for vocational teachers found that two-thirds of those responding preferred a 4-year program. They also preferred a longer and earlier student teaching experience, feeling that it would result in the best-prepared vocational teachers. A West Virginia study (Lawrence 1983) investigated the value of courses taken in teacher education programs to individuals after they became vocational agriculture teachers. Agriculture and agricultural education courses were rated as having the highest value. Biology, chemistry, and English were rated as being of some value. Courses in algebra, educational psychology, principles of education, and reading in the content areas were rated as having the lowest value. A study of graduates of Colorado State University in agricultural education (Crowder 1979) found that the least helpful courses were those in art, humanities, and psychology. The most helpful activities were student teaching and courses in technical agriculture. A follow-up study of Texas A&M University baccalaureate graduates in agricultural education (Moss and Webb 1981) found that courses in accounting, finance, management, and marketing should be included in university preservice teacher education. A study in Idaho (Orthel 1979) found that teachers indicated a need for more credits in agricultural mechanics and technical agriculture subjects. Like the previously cited study conducted at Colorado State University, the respondents in this study indicated that student teaching was the most useful course in agricultural education.

What competencies are needed by beginning vocational agriculture teachers? Witmer (1979) sought to answer this question in a Pennsylvania study. He found that 107 competencies were essential for entry-level employment. He also found relationships between the importance given the competencies, especially those in professional education, and previous enrollment in vocational agriculture. Shippy (1979) investigated the pedagogical competencies needed by beginning vocational agriculture teachers in Delaware and found that 246 of the 250 competencies studied were necessary. A study of the occupational experience requirements for certifying teachers (Miller and Green 1979) revealed that 10 States do not require any, 9 require 2 years, 7 require 1 year, 3 require 3 years, and 5 have varying requirements.

Inservice education is an important component of professional preparation. A study by Turner (1982) found that the greatest inservice needs of Virginia vocational agriculture teachers were in the areas of production agriculture and agricultural mechanics. Eaves (1980) investigated inservice needs in Georgia and found that the teachers felt a need for training in a number of diverse areas

in technical agriculture. A study (Shelhamer 1982) of the impact of three years of inservice education in agricultural mechanics found that inservice can and does influence what is taught in vocational agriculture programs in the area of agricultural mechanics. The study also found that changes in teaching techniques can result from inservice in technical areas. The study concluded that inservice training will result in major instructional changes.

Retention of teachers has been investigated by several researchers. Dickens (1978) studied why vocational agriculture teachers enter and remain in teaching. He found several factors influencing the decision to enter teaching, with enjoying teaching about agriculture subjects a top reason. He found 12 factors that influenced teachers to remain in teaching, including enjoyment of teaching, job security, and retirement plans. A study in North Dakota (Olson 1979) on why teachers remain in teaching revealed, among other things, that the teachers derive satisfaction from serving others and observing the development of students. A study by White (1979) in Oklahoma found that the opportunity to work with FFA activities was important. The least influential factors were facilities and equipment and monetary considerations. Reilly (1979), in a Kansas study, found that satisfaction from helping students to mature and learn was important to those who remained in teaching. Teachers who planned to quit teaching cited lack of respect for teachers, discipline, salary, and fringe benefits as dissuading them from remaining in teaching.

Teacher Education Programs

The preservice and inservice preparation of teachers of vocational-technical education in agriculture has traditionally been carried out by agricultural teacher educators at colleges and universities. A study by Peters and Moore (1982) investigated the administrative locations of agricultural teacher education programs. They identified 83 programs in the United States and concluded that there were no major differences between those in colleges of education and those in colleges of agriculture. There was a tendency for more programs in colleges of education to be approved by the National Council for Accreditation of Teacher Education (NCATE); however, programs in colleges of agriculture tended to have larger operating budgets.

The management functions in agricultural teacher education programs were studied by Everett (1981). She found that the functions of staffing and planning were most important to teacher educators and may be related to their job satisfaction. Bowen (1980) found that agricultural teacher educators had a very high level of job satisfaction. The study also revealed that there were no differences in job satisfaction between tenured and nontenured faculty, between the academic ranks, or between kind of institution at which the teacher educator was employed.

The standards of quality for agricultural teacher education programs were investigated by Hemp and Swanson (1980). They identified 22 program standards and 126 criteria. Their work furthers several previous efforts by others in the specification of program standards.

Teacher Education Methods

Research into the methods used in agricultural teacher education has been limited. Peters (1980) has investigated the effects of microteaching and reflective teaching at The Ohio State University. The results are somewhat mixed but in two of three situations undergraduate students in reflective teaching reported a higher degree of satisfaction with their teaching performance than those in microteaching. In a later study at Purdue University, Peters (1983) found that reflective teaching was a relevant and effective technique to use in an introductory teacher education course.

A study of the state of the art in vocational education was made by Parmley and Newcomb (1980). They found a number of similarities among the different areas of vocational teacher education. Agricultural education placed more emphasis on demonstrations, field trips, filing systems, and youth organizations. Early experience in the sophomore and junior years is used by nearly all programs. Minimum grade-point averages are usually required for admission to teacher education.

Teacher Education Student Organizations

An investigation of the student organizations in agricultural teacher education departments in the United States (Rush and Hillison 1983) revealed that the Collegiate FFA was most popular, with 47 percent of the universities having this organization. The other commonly found organizations were Alpha Tau Alpha and agricultural education societies. The study concluded that student organizations are important to agricultural teacher educators and preservice students.

INSTRUCTIONAL MATERIALS AND TECHNOLOGY

The use of computer technology is a major new area in vocational-technical agricultural education. Individualized competency-based instruction has undergone further development and implementation in recent years. Research into the area of computer technology, especially that using microcomputers, burst onto the scene in the early 1980s. This will likely be a major area for research in the future. Interested researchers should make careful, up-to-date literature reviews to prevent unnecessary duplication of research efforts.

Microcomputer Applications

A major concern of Bowen (1983b) was to identify the microcomputer competencies needed by vocational agriculture teachers. He found that the competencies teachers needed could be grouped into the following six categories: agricultural education applications, awareness and literacy, hardware, instructional applications, programming in BASIC, and software. He also found that professionals with the Cooperative Extension Service need many of the same competencies. Foster and Miller (1984) studied the microcomputer competencies needed by vocational agriculture teachers and found 24 competencies that were highly important. The highly important competencies were mainly in the areas of operating microcomputer hardware and software and using the microcomputer in the classroom. They also found that competencies in the area of programming skills were rated below average in importance. Hudson (1983) also studied the microcomputer competencies needed by vocational agriculture teachers and recommended that preservice and inservice teacher education programs include instruction to develop the necessary competencies.

Several attempts have been made to assess the extent of use of microcomputers in vocational agriculture programs. In an Iowa study, Wyatt (1984) found that the instructors who had microcomputers were younger, less experienced, and less educated and that they attended more inservice activities and had more students. He also found that those with computers faced two major problems in using them: lack of teaching materials and location of the computer. Hahn (1984) conducted a similar study in Illinois. He found that 91 percent of the teachers have access to microcomputers but only 58 percent were currently using them in their programs. However, 85 percent of the teachers planned to incorporate microcomputers into their programs. Another similar study in Wisconsin (Smith 1983) revealed a significant relationship between the educational level of the instructor and use of microcomputers; however, no direction of the relationship was reported. Further, he found that 83 percent of the teachers had access to a microcomputer.

A number of recent studies have investigated the use of microcomputers as aids in teaching. Rohrbach (1983) investigated the use of microcomputers in teaching areas of agricultural economics to graduate students in agricultural education at the University of Missouri. He found that students taught with lecture-discussion methods scored significantly higher on tests than did those taught with microcomputer-assisted instruction. Wiggins (1984) investigated the effect of teaching method on the development of computer programming skills. He found no difference in

attitude or knowledge on posttest scores between those taught by computer-assisted instruction and those taught by other methods. A study in Mississippi (Elliott 1985) compared traditional lecture methods with computer-assisted instruction in teaching agricultural professionals how to use microcomputers. No significant differences in method of teaching were found on the basis of posttest scores. An Iowa study by Russell (1984) of the use of computer-assisted instruction in teaching farm management and agricultural marketing concepts found no significant differences in the posttest scores of those taught by computers and those taught by other teaching methods. Still another study (Koohang 1984) of using the microcomputer in self-teaching versus classroom lecture concluded that there was no significant difference between student cognitive test scores.

A study by Bowen and Agnew (1984) investigated microcomputers in test taking. They studied student performance, attitude, and time needed for taking an objective test using the microcomputer and by traditional means. The findings show that the method of testing did not significantly influence scores on final examinations when the scores on the midterm examinations were used as a covariate. Also, there was no significant difference in attitude. The findings on the amount of time required to take the test were inconclusive.

Instructional Materials

Research into instructional materials development and use has been somewhat limited. Most of the efforts reported focus on the development process followed in producing the materials.

Walker (1979) evaluated a slide series and student handbook used in preparing students to participate in the FFA nursery-landscape contest. It was found that the materials were useful and that certain modifications could improve use. Haffey (1979) studied the development of an instructional unit on foliage plants in Pennsylvania horticulture programs. Schempp (1980) carried out a similar study in horticulture for the state of New York. Birkenholz (1982) investigated an instructional unit in agriculture/agribusiness management with Iowa vocational agriculture students. A similar study was carried out in teaching soil fertility and fertilizers in Iowa (Hosseini 1982).

Several studies have investigated the effectiveness of various instructional material configurations. J. W. Jones (1980) investigated the impact of an instructional packet on student achievement and found that those taught with the packet had higher achievement in plant and soil science two and one-half years later. Connolly (1980) investigated the effectiveness of an instructional model for teaching vegetable production and found no effect on achievement but a more favorable attitude toward agriculture. Stutzman (1982) investigated the development of a course of study integrating career planning activities with agricultural production and found that it could be successfully done. Simmons (1982) studied the effect of a floral merchandising and design record book on student achievement. He found that such a procedure was effective in helping students obtain a higher income in floral design. Baggett (1982) studied the influence of teaching agricultural career information using filmstrips and narrated cassettes on career interest of students in grades 7, 8, and 9. He found that the posttest scores of males were significantly higher than those of females when these materials were used.

Research into instructional materials needs careful assessment. Are researchers asking the right questions? In some cases, the research lacks meaning. It is suspected that the research does not have rigorous experimental and control group delineation and activities. In some of the studies, it appears that the researcher was investigating the effects of instruction versus virtually no instruction to achieve the same objectives. Under such situations, tests of achievement would certainly produce higher scores for those students who were taught with the experimental materials.

PROFESSIONALISM

Considerable research has been reported that addresses various aspects of professionalism, such as morale, retention, and reentry. None was found on professional organizations in agricultural education. Some research has addressed the area of master and beginning teachers.

Master Teachers

The distinguishing characteristics of master teachers of vocational agriculture were investigated in Ohio by Hedges and Papritan (1983). They found that the following characteristics were important: keep technically up-to-date, be motivated, be interested in the student, set directions, evaluate performance, develop a positive attitude, use community resources, and have a high quality SOE program for each student.

Teacher Morale and Satisfaction

Morale of vocational-technical agriculture teachers has been a concern among agricultural educators. Debertin (1983) investigated the morale of teachers in North Dakota using the Purdue Teacher Opinionnaire. He found that, in general, a modest level of favorable morale exists among teachers, with the highest being associated with satisfaction with teaching and the two lowest relating to teacher salary and teacher load. He also found that morale tended to be higher among teachers with the most teaching experience.

A study of the relationship of selected variables to the morale of Ohio vocational agriculture teachers found that the overall morale was low (Dyer 1983). Those teachers with lowest morale were those with total responsibility for their FFA chapter's activities, those with a bachelor's degree and less than or equal to 20 additional hours of education, and those without responsibility for young farmer education. Teachers with low morale tended to have heavy teaching loads, community pressures, "red tape," and problem students in their classes.

The first year as a teacher is often considered to be the most difficult. A four-state study completed at North Dakota State University (Fegert 1984) revealed that the most serious teaching problems for first-year vocational agriculture teachers were time management, student motivation, and supervised occupational experience. A study of Indiana teachers (Sunderhaus 1984) revealed that the most difficult task areas were adult programs, supervised occupational experience, and young farmer programs. Sunderhaus found that the least difficult area was FFA activities. A study of Georgia teachers (King 1984) found that the area rated most difficult was that phase of the program dealing with young and adult farmers. In a Louisiana study on the problems encountered by beginning teachers (Beard and Burnett 1984), it was found that most beginning teachers do not consider teaching situations to be serious problems; however, they do need to be better prepared to teach students with low academic ability, handle discipline problems, motivate students, and effectively master time management.

Commitment to teaching by vocational agriculture teachers in Ohio was studied by Etuk (1984). None of the demographic variables studied had a substantial or strong relationship to commitment to teaching. Using stepwise multiple regression analysis, it was found that personal importance, first-year job challenge, vocational agriculture teachers' cohesion, and self-image were the best predictors of commitment to teaching as a profession.

Job satisfaction has been investigated in several studies. A study of Texas vocational agriculture teachers (Collins 1982) attempted to identify selected factors that influence job satisfaction. Of the 67 factors studied, 46 were found to be sources of satisfaction and 8 were sources of dissatisfaction. The greatest source of satisfaction was "working relationship with the area supervisor," whereas the greatest source of dissatisfaction was "school emphasis on the athletic program." A study in Louisiana (Kotrlik, Woodley, and Sharp 1981) attempted to compare the perceived level of job satisfaction of vocational and nonvocational teachers. In general, the teachers were satisfied with their jobs and there was little difference in job satisfaction of vocational and nonvocational teachers. A later study in Louisiana (Grady 1985) revealed that vocational agriculture teachers have a moderate level of job satisfaction.

Teacher Retention

Several recent studies have addressed teacher retention. A study by Waltz (1982) in Missouri dealt with factors influencing the tenure of vocational agriculture teachers. In the areas studied, he found little difference between those who stayed in teaching and those who quit except that those who stayed tended to earn more college credits and attend more inservice activities. White (1979) studied factors influencing Oklahoma teachers to remain in the profession and found that teachers are influenced to continue by the interactions among a combination of factors. The major areas of influence included FFA and adult farmer organizational activities, teaching situation, community support, family and personal opportunities, and professionalism. Dickens (1978) studied reasons why teachers enter and remain in teaching. He found a variety of responses, including interest in subject matter, feeling of accomplishment from teaching, and flexibility in developing their own programs. A North Dakota study of factors influencing teachers who had remained in teaching three years or more to continue teaching (Olson 1979) found that satisfaction from serving others, observing student development, working in agriculture, being innovative, and varying the work done were important. Reilly (1979) conducted a similar study in Kansas and found that opportunity to help students mature and learn, positive attitude toward the community, respect for teachers, and achievements of students in FFA activities were important.

Research by Shadle (1980) at The Pennsylvania State University investigated tenure factors. The main reasons given by teachers for leaving teaching were the following: long-range occupational goal was something different than teaching vocational agriculture, salary, inadequate administrative support and backing on decisions, students in class who should not have been in vocational agriculture, dislike of students' attitudes, and dislike of disciplining students. In a study in Nebraska addressing a similar problem, Dillon (1978) identified the following five major reasons why vocational agriculture teachers quit teaching: too much preparation required for classroom teaching, long hours, students lacked interest, opportunity to join a family farm business, and time required for FFA activities.

A Virginia study investigated reasons why former agriculture teachers return to teaching (McMillion 1978). Economics was a prime motivator, as indicated by the following reasons: self-employed persons for whom business is bad returned to teaching; elected superintendents of education who lost reelection returned to teaching; and respondents realized that retirement benefits can be increased by teaching. McMillion also found that the desire to work with youth was important.

RELATIONSHIPS WITH PUBLICS

Maintaining effective relationships with the publics served by vocational agriculture is considered by many agricultural educators to be an important role of the teacher. Further, promoting effective relationships has been considered of equal importance. Due to very few reported studies in these areas, there appears to be a definite need to pursue research on relationships with the various publics.

Public Perceptions

An Iowa State University study (Wubben 1979) dealt with the perceptions of selected groups toward the role of vocational agriculture, with emphasis on the needs of youth. The groups included parents, educators, and high school students. These groups gave major importance to the development of salable skills and attributes that make the worker an intelligent and productive participant in society. To develop an appreciation of the beauty in literature, art, and music and to cause the student to realize his or her capacity for creativity in these fields were perceived to be of least importance.

A Mississippi study by Byler and Cantrell (1981) analyzed the role of the vocational agriculture instructor as a community agricultural leader. Ratings on a 55-item instrument suggest that vocational agriculture instructors do have important roles as community leaders. The most important variable to enhance the instructor as a community leader was the support given by the community to the program.

The perceptions of administrators on National issues in agricultural education were studied by Rosati (1984). In this study the perceptions of principals and superintendents were compared to those of teachers, teacher educators, and supervisors. Among other findings, the principals and superintendents considered avocational education to be a purpose of vocational agriculture. This was not true for teachers, teacher educators, and supervisors.

Promotion of Relationships

Agricultural educators are regularly implored to use all available procedures for promoting relationships. Only one study that addressed this area was found. A study by Paulette (1983) investigated local, State, and National sources for delivery of articles to weekly newspapers. He found no significant difference in the use of articles on the basis of delivery source; therefore, source has no effect on the number of articles printed. However, it was found that larger weekly newspapers tended to print more information about vocational agriculture.

INTERNATIONAL AGRICULTURAL EDUCATION

If the number of studies is a measure, interest in international agricultural education is expanding at a rapid rate. Many of the recent studies address specific agricultural problems in the various countries. Some are evaluative studies; others are developmental. A high proportion focus more on extension methods and needs than on vocational-technical agricultural education approaches.

Program Development

Various research efforts have been made in the attempt to design appropriate programs of agricultural education. Some of the efforts have concerned fairly narrow areas of agriculture while others have been more global. Kim (1983) studied the curriculum of four agricultural junior colleges in Korea. Fuatai (1983) developed a curriculum for the junior secondary schools in Western Samoa. A plan for teaching agriculture at the upper secondary level in Trinidad and Tobago was developed by Mangroo (1983). The design of a dairy/beef cattle production program for Nigeria involved using a modified Delphi technique (Yorama 1983). Ndifon (1983) studied the feasibility of a community-based food crops program in Ikom division of Cross River State, Nigeria. Christian (1983) studied the design of vocational agriculture programs in the United States for implications in Sierra Leone. W. M. Smith (1981) studied the need for secondary school agricultural education in Jamaica.

Several studies that investigated competency needs have been reported. Among these are the competencies needed by farmers in Al-Hassa Oasis, Saudi Arabia (Shibah 1983); competencies needed by poultry producers in eastern Saudi Arabi (Al-Zahrani 1983); competencies needed by dairy farmers in Sudan (Omer 1983); and competencies needed by grain, poultry, and swine farmers in Nigeria (Metala 1980).

Studies have been made evaluating agricultural education programs in various countries. Dlamini (1982) evaluated the agriculture programs in the secondary schools of Swaziland. Lulandala (1983) evaluated the Tanzanian Ministry of Agriculture Training Institutes and found several problems: lack of inservice education for faculty, inadequate facilities and visual aids, and lack of advancement opportunities. Ogbozo (1984) assessed the vocational agriculture programs in selected Nigerian schools and found a need for faculty inservice training, more reference books and teaching aids, hiring better faculty, and more equipment. McMillion (1984) investigated how agriculture was taught in the southern education region of New Zealand. Akpehe (1981) evaluated the curriculum in the agricultural training centers in Nigeria.

Technology Dissemination

Various ways of disseminating new technology in various countries have been investigated. A study of the effectiveness of radio agricultural programs in the Fiji Islands (Umar 1983) revealed that the progressive farmers did listen to the radio for farm information and that the three major

languages used in the broadcasts were sufficient. The effectiveness of methods of disseminating information on crop and livestock production in Senegal was studied by Kane (1983). Three methods were rated superior: method demonstration meetings, general meetings, and farm home visits. Aliyu (1983) studied the role and problems of agricultural information services in Nigeria and, among other things, found that the effective utilization of the service would have a beneficial effect on agricultural development. Teoh (1984) studied the needs for agricultural instructional materials in the region served by the University of the South Pacific. Ramirez (1983) studied the use of television in pesticide education in Costa Rica.

Personnel Preparation

Research has addressed a number of problems in the preparation of individuals for international agriculture. The organizational and operational training needs of international agricultural workers were studied by Seesang (1983). Eighteen constructs were identified and found to be important. It was suggested that the constructs should be of value as a source of curriculum content for professional international agriculture workers regardless of the position they may hold.

Studies have addressed the competency needs and preparation of agricultural educators in various nations. Dayrit (1980) investigated the competencies needed by vocational agriculture teachers in Micronesia. Cushman (1980) studied the professional preparation needed by lecturers in the Department of Primary Industry Colleges in Papua New Guinea.

A study of the use of planned work experience in agriculture in the United States for foreign students (Limbird 1981) revealed that such a procedure would strengthen certain understandings. It was found that the length of training should range from 16 weeks to 1 year. The attitudes of students toward planned work experience differed significantly from the attitudes of faculty advisers and employers.

EXTENSION EDUCATION

The area of extension education is mentioned here because of the expansion of agricultural education programs into extension education. This expansion has occurred in both instruction and research. The research that has been completed addresses extension education problems in the United States as well as many other nations. Some of the research in extension education is reported in agricultural education literature because of the applicability to both areas.

The first effort to compile summaries of extension research was completed in 1984 (Kittrell and Lee 1984). The publication, entitled *Summary of Research in Extension. (A Compilation of Abstracts for 1980-1983)*, contained 164 summaries of research. This publication is scheduled to be compiled and published every other year (even-numbered years in the future). It will be a useful document for researchers and others with extension interests.

Completed extension research can be categorized into the following nine broad areas: administration, agricultural extension, evaluation and accountability, community resource development, 4-H and youth, home economics extension, personnel and staff development, and volunteerism (ibid.). The areas with the largest number of reported studies are agricultural extension and personnel and staff development. Only a few studies have been reported on volunteerism.

The studies in administration focus on a wide range of administrative functions. In an Ohio study of the role of the extension supervisor, Kosoko (1980) found that most agents felt that the program development function was most important. The expectations of supervisors for local extension agents were studied in Texas (Wright 1983). It was found that importance levels assigned by extension supervisors to selected performance competencies were similar regardless of their leadership styles. Studies by S. R. Mullen (1980) and Wells (1981) investigated the most effective lobbying strategies with state legislatures. The budgeting of county-level extension programs in the southern region was investigated by Kittrell and Carpenter (1983). It was found that there is considerable difference in the process used among the states in the southern region.

The studies in agricultural extension typically focused on the diffusion and adoption of new technology and the methods used in the education process. A few examples are listed here. Richburg (1982) investigated the communication behavior of Maryland dairy farmers. Weston (1982) studied the information sources of rice producers in Louisiana. Aliya (1983) studied the use of demonstrations with dry bean farmers in Utah. Devillier (1981) investigated the relationship of farm size to the adoption of recommended practices in sugarcane production in Louisiana. Byler and Cantrell (1982) investigated the diffusion and adoption of selected agricultural technology by soybean farmers in Mississippi.

Research on evaluation and accountability in extension has focused on public perception of extension, measurement of program results, and assessment of various extension methods. Jennings (1983) investigated the perceptions of Arkansas residents toward the Cooperative Extension Service and found that knowing educational level and household income could assist in predicting awareness of extension services. (Those individuals with higher educational and income

levels had greater awareness of extension services.) Ramsini (1980) studied the role of extension advisory committees. Gardner (1982) investigated the impact of extension programs on selected farmers in Virginia.

Research in the area of community resource development has been limited. The few studies focused on farm families (Andrews et al. 1981), senior citizens (Jones 1980), and natural resource development (Beckley 1983).

Considerable research has focused on 4-H and youth programs. Rochon in Louisiana (1981), Manning in Iowa (1982), and Nefstead in Minnesota (1981) investigated participation by youth in 4-H activities. Moe (1980) studied the availability of private support for 4-H in Arizona. The development of leadership skills through 4-H was investigated in Ohio by three researchers: Larkin (1980), Horton (1983), and Fisher (1982). Snyder (1981) and Rigsby (1981) studied equity in Ohio from the perspectives of sex role and handicapping conditions. Mullen (1980) conducted a statewide study of the image of 4-H in Massachusetts.

Research in the area of personnel and staff development has focused on attrition of extension professionals, professional competencies needed by extension professionals, and personality types as related to job satisfaction and performance. Squire (1982) studied factors that influence 4-H agents to quit and found that salary and weekend and evening meetings had "very much influence" on decisions by former agents to leave extension work. Church (1979) studied factors that influence agents to stay with extension and found that the freedom to plan and carry out their own program as well as civil service retirement benefits were important. Several studies have investigated job satisfaction of extension personnel (Graham 1983; Hilliker 1982; S. L. Smith 1981; Wells 1982). Studies of professional competency needs for extension agents (Beeman et al. 1979; Bowen 1983a; Gonzalez 1982; Little 1981) and 4-H agents (Yeiser 1982) have been made.

Volunteerism research has focused on several areas, with emphasis on volunteer 4-H leaders (Bigler 1982; Davis 1981; Frey 1982; Rohs 1982). In general, the research has found that the leaders are more likely to be females and have children in 4-H. They also need assistance in performing their volunteer duties efficiently.

SUMMARY

The efforts of many agricultural educators in applying research methods to solve problems in agricultural education have been reported in this publication. It is hoped that this review has accurately reflected the major findings of these studies.

Contributions of Completed Research

The benefits from research are realized when the agricultural industry is better served by more efficient, productive employees and entrepreneurs. This should result in higher standards of living for all people. Surely, the delivery of education programs has been improved by the research. Specifically, improvements should occur in curriculum and program development, instruction, student organizations, supervised practice, personnel preparation, professionalism, and understanding the agricultural education needs of various nations. Documentation of the contributions of research to agricultural education is needed. Such research would give substance to the evidence of improved program quality.

Future Research Needs

A review and synthesis of research should help identify areas in need of study. Individuals contemplating research may find strong support for certain studies by the contents of this publication as well as for areas not included. With the latter, it is strongly possible that no research has been done on the subject in recent years and action is needed to initiate the research.

Agricultural educators must develop the ability to formulate challenging research questions. Future research must address areas not previously investigated. Much research has been done in an attempt to justify various agricultural education program components and methods. There is a strong need to focus research into areas that will invigorate agricultural education by challenging tradition. Without such efforts, the program will become stagnant, out-of-date, and ineffective. If so, then the demise of agricultural education is imminent.

A few areas for future research efforts are as follows:

- **Evaluation and accountability**—Studies addressing quality indicators in programs and the achievement of students who have been enrolled are needed.
- **Administration and supervision**—Studies examining local school organizational structures as related to agricultural education and the administrative and supervision process are needed. Particularly needed are quality efforts investigating the provision of secondary instruction in area vocational schools versus comprehensive high schools.
- **Program delivery**—Studies dealing with program components and delivery methods are needed. (There may be a need to abandon some of the traditions!)

- **Curriculum**—Studies analyzing various curriculum areas, such as core curricula, locally derived curricula, and general principles versus industry practices are needed.

- **Alternative delivery of instruction**—Studies investigating alternatives for delivering instruction, especially in nontraditional areas such as agribusiness, and using increased industry involvement are needed.

- **Personnel preparation**—Research identifying the kind of preparation needed by teachers is necessary. The increased use of nondegree teachers who have industry experience in lieu of formal education has long been a matter of concern.

- **Technology**—Research assessing the adoption of new instructional technology in agricultural education is needed.

- **Manpower studies**—Research on employment trends and needs in the agricultural industry is needed. Such research must utilize appropriate terms and definitions even if they challenge those of agencies responsible for employment data. Of course, a collaborative effort with these agencies would be preferable!

Commitment to Research: Need for a National Agenda

There appears to be a strong need for increased commitment to research in agricultural education. Systematic inquiries into substantive problems are required. Such research could serve as a part of the base for maintaining, improving, and expanding agricultural education programs.

One of the best ways of improving the direction, quality, and efficiency of research in agricultural education would be to develop a National research agenda. Such an effort would give credibility and justification to increased research efforts. The development of an agenda must have national-level leadership and support from the professional organizations of teachers, supervisors, and teacher educators. Leaders in the profession need to step forward and assume initiative in the development of a written document specifying the agenda. Such a document would be very useful in setting priorities and gaining access to increased funding sources.

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